

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **05-125184**

(43)Date of publication of application : **21.05.1993**

(51)Int.Cl. **C08G 69/36**

C09J177/02

C09J177/06

G03F 7/038

(21)Application number : **04-085152** (71)Applicant : **SCHERING AG**

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(30)Priority

Priority number : **91 4111670** Priority date : **10.04.1991** Priority country : **DE**

**(54) POLYAMIDE, PREPARATION THEREOF, BONDING METHOD AND
PREPARATION OF RELIEF PRINT**

(57)Abstract:



PURPOSE: (J) To provide a polyamide that has a granular structure, has an efficiently delustered surface and additionally a scratch-resistant surface, and is useful for relief printing.

CONSTITUTION: (A) A composition comprising A1: an aliphatic dicarboxylic acid of formula I (n is 4-11) (e.g.; sebacic acid, etc.), A2: an acid of formula II (R is a group of formula III, etc.), (e.g.; isophthalic acid), the molar ratio of A1 to A2 being 1:0.1-1:2, and if necessary, A3: upto 0.1 mol. of a saturated monocarboxylic acid, (B) a diamine selected from 1,6-diaminohexane, etc., and (C) an aminocarboxylic acid of formula IV (n is 5-11) or a lactam are condensed at a temperature of 200-280°C by means of an amidation catalyst as required. At the completion of the reaction, a negative pressure of less than 100 millibar should be caused.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

[JP,05-125184,A]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] The polyamide on the basis of mixture and this polyamide of an acid, an amine, and an amino carboxylic acid are used for this invention, and it relates to the manufacturing method of the relief printed matter which has xanthochroism-proof as shows the good adhesion on especially various base materials.

[0002]

[Description of the Prior Art] The relief ornament of an organic and inorganic base material is well-known for a long time.

[0003] for example, the uneven stamp which has the plate or type with which the original technique which prints the shape of relief on paper or pasteboard for a binding of a book, an advertising supply, a picture postcard, a card, wrapping, etc. was sculptured -- a printing machine top -- a color imprint -- or it is in carrying out without being accompanied by color imprint. In this case, at one or more processes, a printing image is printed by monochrome or multiple color, comes up after this and is printed.

[0004] Recently, the strange method of said approach has spread increasingly. In this case, the stamp phase is lost although the base material is actually equipped in addition with the printing image again. Manufacture of relief is performed by covering of printed matter which used thermoplastics.

[0005] Technically, a base material is offset printing and an approach which is printed by this offset printing using printing ink in ordinary use is advancing. The pulverized thermoplastics is immediately distributed to up to the still humid adhesive front face of printed matter after this. An excessive amount is the part which is not adhesiveness, and suction removal is again printed as a result carried out. In the case of heat treatment which continues next, resin is heated to the temperature exceeding that melting point.

[0006] In this case, the requirements for a single string for which it is most important that it can grind to impalpable powder which resin does not have the color of a proper in thermoplastics, has the color of the fewest possible proper in it, does not block to it under a service condition, therefore has been been smooth into it are imposed.

[0007] although the polyamide resin on the basis of the fatty acid and ethylenediamine of a dimer which were used till today for the aforementioned purpose satisfies a series of aforementioned requirements -- however, the number of colors and color fastness -- in addition about adhesion with a metal and glass, it is necessary to improve especially Moreover, the fatty acid hydrogenated for manufacture of this polyamide resin needs iodine number <10, and the small amount of air oxygen already produces remarkable aggravation of the number of colors in the case of condensation.

[0008]

[Problem(s) to be Solved by the Invention] Therefore, the technical problem of this invention is finding out resin which has the front face which conquers said fault of the level of a well-known technique once, is smooth, is rich in the effectiveness of having

granular structure in relief printing by today when a photoluminescent front face is supplied unlike well-known resin, gives the front face of delustering, and has *****-proof additionally.

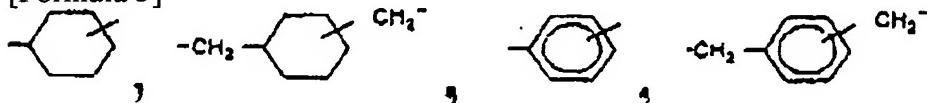
[0009] Similarly, various base materials and the front face which does not have sufficient adhesion with paper, pasteboard, a metal, and glass, good flexibility, admission nature with the color of a substrate, and adhesiveness especially are proposed.

[0010]

[Means for Solving the Problem] The polyamide on the basis of the fatty acid of the dimer by which hydrogenation was carried out, and the amine mixture which consists of congruous combination objects, ethylenediamine, and hexamethylenediamines of ** dicarboxylic acid especially straight chain-like monocarboxylic acid, and branching short chain-like monocarboxylic acid depending on the case is better known than the publication of the Federal Republic of Germany patent application public presentation No. 3510415 specification. although the improvement is actually shown about the number and color fastness of a surface state and a color, for the manufacture, the iodine number boils the fatty acid of a dimer within the limits of <=25 to some extent, and hydrogenation of said product must still be carried out. The relief printed matter which consists of the aforementioned resin is smooth, and has a photoluminescent front face.

[0011] The inside of at least one of the aliphatic series dicarboxylic acid in which the object of this invention is shown by A1 general-formula:HOOC-(CH2)n-COOH [the inside of a formula and n are 4-11], and an A2 general-formula:HOOC-R-COOH[type, and Radical R are [0012].

[Formula 3]



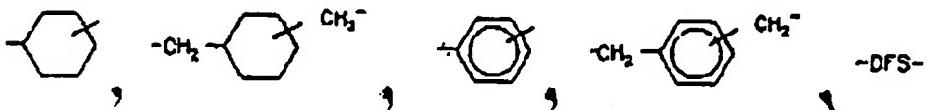
[0013] At least one of the acids which come out and are shown by] which may exist (however, the ratio of A1:A2) it is in the range of 1:0.1-1:2 mols -- the amount of a carboxylic acid given in A3 A1 -- receiving -- the saturation monocarboxylic acid in the amount to 0.1 mols -- B) 1, 6-diaminohexan, 1, a 5-diamino-2-methyl-pentane, 2, 4, and 4(4, 4, 2)-trimethyl -1, 6-diaminohexan, at least 1(however, component A1)+ of the diamine which consists of a group of 1 and 9-diamino nonane and 1, and 12-diamino dodecane -- the rate of A2 and B among a C general formula: $H_2-N-(CH_2)$
 $n=COOH$ [type to the amino group and an acid radical, essentially, and it is the equivalent At least one of the amino carboxylic acid shown by] whose n is 5-11, or the lactam of its (however, per one mol of carboxylic acids, the amino carboxylic acid, or 0.5-1.5 mols of lactams of the acid indicated to A is used) -- the very thing -- at the temperature of 200-280 degrees C by the well-known approach It is the polyamide which can obtain by carrying out condensation and is characterized by having produced the negative pressure of less than 100mb in this case at the time of the conclusion of a reaction, using an amidation catalyst in ordinary use together by the case.

[0014] As for another object of this invention, 0.3-0.8 mols of isophthalic acid are used as 1.0 mols of sebacic acids, and a component A2 as a component A1.

Depending on however, the case It may be substituted even for 0.05 mols even of isophthalic acid with the fatty acid of a dimer, and B is characterized by 1.3-1.8 mols of 1 and 6-diaminohexans, and C by using 2.6-3.6 mols of caprolactams.

[0015] Depending on at least one of the aliphatic series dicarboxylic acid in which another object of this invention is shown by A1 general-formula:HOOC-(CH₂)_n-COOH [the inside of a formula and n are 4-11], and the case, the inside of an A2 general-formula:HOOC-R-COOH[type and Radical R are [0016].

[Formula 4]



[0017] at least one of the acids shown by] to which it appears, and may exist and - DPS- expresses the radical of the fatty acid of a dimer -- [-- however, the ratio of A1:A2 1:0.] which may have 05 to 1:2.0 mol in the range of 1:0.5 mols advantageously, A3) As opposed to the amount of a carboxylic acid given in A1 The saturation monocarboxylic acid B1 in the amount to 0.1 mols, 6-diaminohexan, 1, a 5-diamino-2-methyl-pentane, 2 and 4, 4(4, 4, 2)-trimethyl -1, 6-diaminohexan, at least 1(however, component A1)+ of the diamine which consists of a group of 1 and 9-diamino nonane and 1, and 12-diamino dodecane -- the rate of A2 and B among a C general formula:H2-N-(CH₂)_n=COOH[type to the amino group and an acid radical, essentially, and it is the equivalent At least one of the amino carboxylic acid shown by] whose n is 5-11, or the lactam of its (however, per one mol of carboxylic acids, the amino carboxylic acid, or 0.5-1.5 mols of lactams of the acid indicated to A is used) -- the very thing -- at the temperature of 200-280 degrees C by the well-known approach It is the manufacturing method of the polyamide characterized by carrying out a polycondensation, using an amidation catalyst in ordinary use together by the case, and being made reduced pressure of less than 100mb in this case at the time of the conclusion of a reaction.

[0018] Another object of this invention is the manufacturing method of the relief printed matter which uses the polyamide resin by this invention.

[0019] the straight chain-like dicarboxylic acid which has 6-13 carbon atoms as dicarboxylic acid used for A1 by this invention of a publication together, for example, an adipic acid, cork acid, an azelaic acid, and a brasylic acid -- and a sebacic acid and deca methylene dicarboxylic acid correspond advantageously. When desirable, short chain-like dicarboxylic acid, for example, an adipic acid, or a pimelic acid can use it together.

[0020] as dicarboxylic acid given in A2 -- 1, 4(1 3)-cyclohexane dicarboxylic acid, 1, 4(1 3)-cyclohexanediacetate, terephthalic-acid, 1, and 4(1 3)-FENI range acetic acid - and isophthalic acid is used especially.

[0021] What the fatty acid of a dimer expresses relates to the fatty acid with which the polymerization of the marketing which has the iodine number about 100-130 and, by which the aforementioned content of the fatty acid of a dimer is generally raised to about 85 - 100% with a conventional method was carried out.

[0022] This iodine number is measured by the conventional method in practice, and is indicated by the iodine per 100g of matter.

[0023] This fatty acid by which the polymerization was carried out can be manufactured 12-22 carbon atoms from the nature which has 18 pieces advantageously, and synthetic a little salt machine nature unsaturated fatty acid with a conventional method (for example, refer to a U.S. Pat. No. 2482761 specification, and the U.S. and a **** No. 3256304 specification).

[0024] A typical commercial polymerization fatty acid is an acid of monomer which has the following presentations mostly before distillation. Acid of a 5 - 15-% of the weight dimer Acid of a 60 - 80-% of the weight trimer, and a high polymer The content of the fatty acid with which the polymerization of the fraction of the acid of a dimer was carried out to a trimer fatty acid and altitude after 10 - 35-% of the weight distillation, hardly including monocarboxylic acid is <=1 % of the weight.

[0025] the approach that the distilled fatty acid or the fatty acid which is not distilled is well-known -- the lower iodine number -- it can hydrogenate within the limits of 10-40 advantageously. According to this invention, the fatty acid of the dimer which has the iodine numbers 10-15 and the content of the fatty acid of at least 90% of the weight of a dimer and by which hydrogenation was carried out is advantageous.

[0026] The presentation of this fatty acid is measured by the gas chromatography (GLC) of a conventional method, and the publication of a dimer content includes the content of the all or the dimer product which carried out the decarboxylation partially formed unescapable in process of small dimer-izing with the fatty acid of a dimer in this case.

[0027] A1: 1:0.1-1:2 mols, the ratio of a carboxylic acid given in A2 is within the limits of 1:0.3 to 1:0.8 mols advantageously, and is dependent on the amount and class in few rates of Component C, i.e., amino acid, or a lactam at each component list of A1 and A2. For manufacture of a light-fast polyamide, according to this invention, advantageously, the fatty acid of a dimer is not used at all, or 0.05 mols or less are used especially together.

[0028] rather than it can use the monocarboxylic acid which has even 18 C atoms and has 16-20 C atoms in this case for accommodation of molecular weight -- the acid of the high shape of saturation and a straight chain -- for example, according to this invention, a palmitic acid and stearin acid are especially advantageous. The aforementioned acid.is advantageously used for A1 together in the amount of 0.05-0.1 mols to the carboxylic acid of a publication.

[0029] Similarly, it is also possible to adjust molecular weight with superfluous acidity or the superfluous amount of amines. However, since an isolation carboxyl group or the amino group exists in a molecule in this case, according to this invention, the aforementioned approach is slightly advantageous.

[0030] as an amine component -- advantageous -- 1 and 6-diaminohexan -- further -- the isomer mixture of 2, 4, 4(4, 4, 2)-trimethyl-1, 6-diaminohexan, 1, and 9-diamino nonane and 1, and 12-diamino dodecane is used for a 2-methyl-1,5-diaminopentane list.

[0031] The rate of the acid component A and the amine component B is the equivalent mostly, preferably, a polyamide shows amine ** and the acid number of a maximum of 10, and total of amine ** and the acid number is ten or less in this case.

[0032] It is amino acid as amino acid usable together shown by this invention given in C) by general formula:H2-N-(CH2) n=COOH [the inside of a formula and n are 5-

11], or a lactam, and n is 5 advantageously.

[0033] 1.0 mols are used advantageously per one mol of carboxyl groups of the dicarboxylic acid indicated to A), amino acid, or 0.5-1.5 mols of lactams.

[0034] the need -- responding -- an accommodation of molecular weight or viscosity sake -- monocarboxylic acid in ordinary use -- the small amount of stearin acid can be used together preferably.

[0035] The polyamide resin used by this invention can be ground also under spreading conditions to powder which has been smooth, using an anti-blocking agent, for example, a stearate, Aerosil, etc. together depending on the case. the grain size of this powder -- the need -- responding -- it can change -- 40 - 500 micro meter - - it is 80 - 200 micro meter advantageously.

[0036] The melting point of this resin conforms to the practical demand. Although this melting point is low to extent which does not generate damage on a base material or substrate lacquer enamel with a perfect melting temperature, it is high to extent which does not produce blocking in the case of another side and spreading temperature.

[0037] The advantageous melting point is for 100-140 degrees C advantageously (it was measured by the ring and ball method), and 90-150 degrees C of abbreviation.

[0038] Furthermore, this resin is attained in the cooling phase where the narrow melting range is shown, consequently quick adhesive disappearance and disappearance of a block follow a melting phase. This is remarkably important because of achievement of quick stroke time amount.

[0039] It is 220 degrees C, and melt viscosity is systematically measured according to directions of the manufacturer of an instrument using the rotational viscometer which has the plate / ball equipment of Haake, and is within the limits of 20 - 50 Pa-s especially 15 to 80 Pa-s advantageously about ten to 200 Pa-s.

[0040] When the polyamide resin by this invention which is adhesion nature is used for the color of a substrate in ordinary use in the aforementioned field, in relief printed matter, the combination of effectiveness can be attained in an additional and new property list.

[0041] It is smooth, and unlike the resin of daily use till today when a sensitive front face is supplied with photoluminescent, the resin by this invention is rich in the effectiveness of having the leather structure of a detailed orange peel where it has granular structure or remarkable *****-proof, and gives the front face of delustering to relief printed matter.

[0042] The resin by this invention shows additionally the adhesion with a metal and glass which stood high with good adhesion with the textiles which consist of the natural fiber and/or synthetic fiber like a base material in ordinary use, for example, pasteboard, paper, a textile, and a fiber tapestry.

[0043] According to granular structure, it produces a grip easy very good in ** the printed container, for example, for body [in / especially / cosmetics industry] care-and-cleaning agents, or ** additionally.

[0044] By the color and the high transparency of very few propers of the polyamide resin by this invention, change of the colored color tone under this resin is not generated, but change of a color tone fully has xanthochroism-proof also between spreading or under UV-load.

[0045] The inspection approach of a polyamide It broke coarsely, and cooled by dry ice and/or liquid nitrogen, and the polyamide by this invention indicated by 1-22 A examples was ground between the colds in the impact grinder (Alpine). In this way, the particle fraction of 40 - 500 micro meter was carried out the screen exception from the obtained powder using the sieve. On the field (it is smooth) where the pasteboard of a white light weight was applied, the hyperviscous offset ink colored black was applied with the manual simple printing machine, and the powder carried out the screen exception after the aeration time amount for 10 - 20 seconds was applied. With the adhesive property of a coloring agent, the powder of amount sufficient for formation of the front face in which the structure was formed has been pasted up, and the matter of another side and an excessive amount was able to be removed again convenient. In this way, the pasteboard prepared in this way was heated with IR light from the top with the distance of 20-30cm in the special powder dissolution container (Konvexograph of Grafra). In this case, the granular surface structure of *****-proof was remarkably acquired after the residence time for about 5 - 10 seconds. a polyamide -- actually -- the color of a proper -- having -- and yellowing -- since there was no inclination, "gray-ization" of a black color tone was unobservable to printing ink.

[0046] Approach First, the polyamide resin lacquer enamel in which the so-called reaction is possible is the form of a desirable motif, and another strange method of spreading of the color of B substrate has it in being stenciled on the endless band form in the case of intaglio printing, for example, aluminum foil. The aluminum foil which the aforementioned lacquer enamel constituted specially disappeared adhesiveness immediately after printing unlike above-mentioned offset ink, consequently was rolled round after the printing process can be opened again convenient. The powder which the section of the foil which was able to be opened again, or a foil was heated just before distribution of powder, and the lacquer enamel stenciled by this became adhesiveness, and the aforementioned adhesiveness was held for further 3 - 10 seconds after cooling by that special configuration, consequently was distributed in this way is a desirable amount, and while it had been tintured with adhesiveness on lacquer enamel, it stops. The further advance of a dissolution process is produced as already mentioned above.

[0047] Approach The matter strip of polyester/wool yarn with a C width of face of 5cm (55% / 45%) was pasted up. Polyamide powder had the particle (300-400micro). This coverage was matter 20 g/m².

[0048] The covered matter strip was pasted up with two matter strips which have not been covered at the temperature of about 20-30 degrees C exceeding the softening temperature of polyamide adhesives. It was adhesion time amount for about 15 - 20 seconds, and the adhesive pressure force was 400 g/cm².

[0049] It was completely immersed in the perchloroethylene bath and the pasted-up matter was measured with the wet method after 30 minutes (exfoliation strength). DIN53310 performed evaluation.

[0050]

[Example]

Example of manufacture of polyamide resin In the 2l. three necked flask equipped with one agitator, the thermometer, and the top-down cooler Under nitrogen-gas-

atmosphere mind A sebacic acid 1.0 mols 202.0g; Isophthalic acid (A1) 0.5 mols 83.0g; stearin acid (A3) 0.07 mols 20.0g; caprolactam (C) 3.0 mols 339.0g; hexamethylenediamine (B) 1.57 (A2) 0.21g (it is 0.025 % of the weight to total weighing capacity) of 182.3g; phosphoric acid to pile (at 85%) It mixed mutually as a catalyst. Additionally, further, it added for better equalization and 100.0g of desalted water was heated at 240 degrees C in 2 hours. The aforementioned temperature was maintained for 2 hours and it lengthened to 2 next hours and a 5mb vacuum in this case. Then, aeration was carried out with nitrogen and the polyamide was emitted. The obtained polyamide showed 129 degrees C (DIN52011) of ring and ball softening points, 220 degrees C viscosity 26.0Paands (it is rotational-viscometer PK401W of Haake (Karlsruhe), and measured according to the directions), the acid number 3.9, and amine ** 0.7.

[0051] The same thing was obtained according to the example indicated to the 1st next table.

[0052] In this case, :AZ in which a sign has the semantics of a degree = Amine ** SZ in KOHmg / matter g = Acid-number R+B in KOHmg / matter g Softening temperature viscosity by the ring and ball method of =DIN52011 = The viscosity Pripol directly measured from melting liquid according to directions of a manufacturer using Haake, the viscometer of Karlsruhe/Berlin, and plate-ball-equipment mold PK401W at 220 degrees C (trademark) = Unichema Have a content below trade name Pripol(trademark)1009= of International, and hydrogenation is carried out. fatty acid of the fatty-acid:monomer which carried out the polymerization Fatty acid of 99.0% trimer of fatty acids of 0.1% dimer Fatty acid of the fatty-acid:monomer which has a content below 1.0%Pripol(trademark)1013= and which carried out the polymerization Fatty acid of 95.0% trimer of fatty acids of 0.1% dimer 5.0% [0053]

[Table 1]

第 1 表

例	酸	ジアミン	添加剤 モル量	AZ				SZ	R+B	粘度 Pa·s
				°C	°C	°C	°C	°C	°C	°C
1	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.07 0.50	ヘキサメチレン ジアミン	1.57	カブロラクタム	3.0	0.7	3.9	129	26.0
2	セバシン酸 ステアリン酸 Pri p o 1 (聖隸商標) 1 0 0 9	1.00 0.07 0.50	ヘキサメチレン ジアミン	1.57	カブロラクタム	3.0	0.5	2.6	110	100.0
3	セバシン酸 ステアリン酸 Pri p o 1 (聖隸商標) 1 0 1 9	1.00 0.07 0.50	ヘキサメチレン ジアミン	1.57	カブロラクタム	3.0	0.5	1.0	103	95.0

[0054]
[Table 2]

例	酸	ジアミン	添加剤	粘度 Pa·S			
				AZ °C	SZ °C	R+B °C	220 °C
モル量							
4	セバシン酸 ステアリン酸 Pripo 1 (笠原商標) イソフタル酸	0,90 0,05 0,10 1,00 0,50	ヘキサメチレン ジアミン	1.55	カブロラクタム	3.0	3.3
						5.3	125
						15.0	15.0
5	セバシン酸 ステアリン酸 ジメチル テレフタレート	1,00 0,06 0,50	ヘキサメチレン ジアミン	1.56	カブロラクタム	3.0	3.0
						6.0	126
						24.0	24.0
6	セバシン酸 ステアリン酸 アジピン酸	0,75 0,08 0,75	ヘキサメチレン ジアミン アミノウンデ カン酸	1.58	カブロラクタム	3.0	0.8
						2.3	126
						29.0	29.0

[0055]
[Table 3]

例	触 媒	ジアミン	添加剤 モル量	AZ			SZ	R+B	粘度 Pa·S
				°C	°C	°C	°C	220 °C	
7	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.06 0.50	ヘキサメチレン ジアミン	1.56	カプロラクタム	4.50	1.0	4.9	143 48.0
8	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.07 1.00	ヘキサメチレン ジアミン	2.07	カプロラクタム	4.0	0.9	2.4	150 56.0
9	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.10 2.00	ヘキサメチレン ジアミン	3.10	カプロラクタム	6.0	0.6	1.5	150 48.1
10	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.05 0.50	ヘキサメチレン ジアミン	1.55	カプロラクタム	1.5	2.5	6.5	126 18.0

[0056]
[Table 4]

例	酸	ジアミン		添加剤:	粘度					
		モル量	℃		AZ	SZ	R+B			
11	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.10 2.00	ヘキサメチレンジアミン	3.10	カブロラクタム	3.0	1.8	8.0	143	22.0
12	アジピン酸 ステアリン酸 イソフタル酸	1.00 0.06 1.00	ヘキサメチレンジアミン	2.06	カブロラクタム	2.0	2.1	8.0	133	26.0
13	アジピン酸 ステアリン酸 イソフタル酸	1.00 0.06 1.00	ヘキサメチレンジアミン	2.06	カブロラクタム	4.0	1.4	5.8	143	31.0

[0057]
[Table 5]

例	酸	ジアミン	添加剤 モル量	AZ		SZ	R+B	粘度 °C Pa·s
				220 °C	°C	220 °C		
14	セバシン酸 ステアリン酸 イソフタル酸	1.00 0.05 0.50	トリメチル ヘキサメチレン ジアミン	1.55	カプロラクタム	3.0	5.1 2.0	138 28.0
15	セバシン酸 ステアリン酸 ドデカンジ酸	1.00 0.05 0.50	ヘキサメチレン ジアミン	1.55	カプロラクタム	3.0	0.6 4.7	98 93.0
16	ステアリン酸 ジメチル テレフタレート ドデカンジ酸	0.05 0.50 1.00	メチルペングタ メチレンジアミン	1.55	カプロラクタム	3.0	3.2 3.7	94 100.0

[0058]
[Table 6]

例	酸	ジアミン	モル量	添加剤				AZ	SZ	R+B	粘度 Pa·s
				220 °C	•C	220 °C	Pa·s				
17	ステアリン酸 ドデカンジ酸 アゼライン酸	0.05 0.50 1.00	ヘキサメチレン ジアミン	1.55	カブロラクタム	3.0	0.8	3.7	124	100.0	
18	セバシン酸 ステアリン酸 ドデカンジ酸 アゼライン酸	0.50 0.05 0.50 0.50	ヘキサメチレン ジアミン	1.55	カブロラクタム	3.0	1.6	4.4	92	89.0	
19	セバシン酸 ステアリン酸 イソフタル酸 1, 4-シクロ ヘキサン ジカルボン酸	1.00 0.08 0.25 0.25	ヘキサメチレン ジアミン	1.58	カブロラクタム	3.0	0.7	1.4	140	54.0	

[0059]
[Table 7]

例	酸	ジアミン	添加剤	AZ		SZ	R+B	粘度 °C 220 °C Pa·s
				モル量				
20	セバシン酸 ステアリン酸 イソフタル酸 Pri P ₀ ₁ (登録商標) 1013	1.00 0.05 0.45 0.05 0.05	ヘキサメチレン ジアミン	1.55	カブロラクタム	3.0	0.6 2.8	91 80.0
21	セバシン酸 ステアリン酸 イソフタル酸 Pri P ₀ ₁ (登録商標) 1013	1.00 0.07 0.50 0.50	ヘキサメチレン ジアミン	1.57	カブロラクタム	3.0	0.7 3.9	109 25.7
22	セバシン酸 イソフタル酸 Pri P ₀ ₁ (登録商標) 1013	1.00 0.45 0.05	ヘキサメチレン ジアミン	1.50	カブロラクタム	3.0	0.4 1.5	112 85.0

[0060]
[Table 8]

第 2 表

番号	第1表の 例	方 法	μ での粒子固分	盛上げ印刷物の表面	
				外 見	状 態
1	1	A	80 ~ 200	極めて均一な、 つや消しの黒色 球構造体	高い耐引摺き性、 極めて良好な接着 性
2	1	B	"	"	"
3	2	A	"	"	"
4	3	"	"	"	"
5	4	"	"	"	"
6	5	"	"	"	"
7	6	"	"	"	"
8	7	"	"	"	"
9	8	"	"	"	"
10	9	"	"	"	"
11	10	"	"	"	"
12	11	"	"	"	"
13	12	"	"	"	"
14	13	"	"	"	"
15	14	"	"	"	"
16	15	"	"	"	"
17	16	"	"	"	"
18	17	"	"	"	"
19	18	"	"	"	"
20	19	"	"	"	"

[0061]
[Table 9]

番号	第1表の 例	方法	μ での粒子画分	盛上げ印刷物の表面	
				外見	状態
21	1	A	< 63	極度に微細な球構造体； 十分な構造体効果の形成	耐引搔き性 良好； つかみ易さ 優れ
22	1	"	300 ~ 400	極めて粗い構造体； 個別のより大きく平らな 溶解した樹脂薄膜； 不均一な構造体	"
				接着温度 ℃	ベルクロルエチレン安定性 N / 5 cm
23	20	C	300 ~ 400	140	36
24	21	C	300 ~ 400	140	38
25	22	C	300 ~ 400	140	45

[CLAIMS

[Claim(s)]

[Claim 1] The inside of at least one of the aliphatic series dicarboxylic acid shown in a polyamide by A1 general-formula:HOOC-(CH₂)_n-COOH [the inside of a formula and n are 4-11] and an A2 general-formula:HOOC-R-COOH[type and Radical R are [Formula 1].



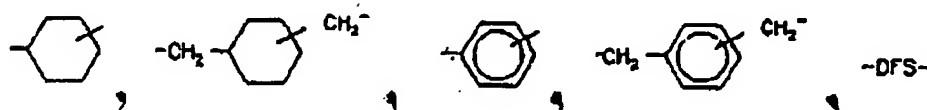
At least one of the acids which come out and are shown by] which may exist (however, the ratio of A1:A2) 1:0. depending on the case where it is in the range of 1-1.2 mols A3) As opposed to the amount of a carboxylic acid given in A1 Saturation monocarboxylic acid in the amount to 0.1 mols, B) 1, 6-diaminohexan, 1, a 5-diamino-2-methyl-pentane, 2, 4, and 4(4, 4, 2)-trimethyl -1, 6-diaminohexan, at least one of the diamines which consist of a group of 1 and 9-diamino nonane and 1, and 12-diamino dodecane, and + (however, component A1) -- the rate of A2 and B among a C general formula:H₂-N-(CH₂)_n=COOH[type to the amino group and an acid radical, essentially, and it is the equivalent At least one of the amino carboxylic acid shown by] whose n is 5-11, or the lactam of its (however, per one mol of carboxylic acids, the amino carboxylic acid, or 0.5-1.5 mols of lactams of the acid indicated to A is used) -- the very thing -- at the temperature of 200-280 degrees C by the well-known approach The polyamide which can obtain by carrying out condensation and is characterized by having produced the negative pressure of less than 100mb in this case at the time of the conclusion of a reaction while using an amidation catalyst in ordinary use together by the case.

[Claim 2] The polyamide according to claim 1 which uses epsilon-amino carboxylic acid and/or a caprolactam for C) as an amino carboxylic acid of a publication.

[Claim 3] The polyamide according to claim 1 from which A2 is substituted even for the ** dicarboxylic acid <0.05 mol of a publication with the fatty acid of a dimer.

[Claim 4] B is a polyamide according to claim 1 for which even 0.3-0.8 mols even of isophthalic acid are used as 1.0 mols of sebacic acids, and a component A2 as a component A1, may be substituted even for the isophthalic acid <0.05 mol with the fatty acid of a dimer depending on the case, and, as for 1.3-1.6 mols of 1 and 6-diaminohexans, and C, 2.6-3.6 mols of caprolactams are used.

[Claim 5] Depending on at least one of the aliphatic series dicarboxylic acid shown in the approach for manufacturing a polyamide according to a polycondensation by A1 general-formula:HOOC-(CH₂)_n-COOH [the inside of a formula and n are 4-11], and the case, the inside of an A2 general-formula:HOOC-R-COOH[type and Radical R are [Formula 2].



at least one of the acids shown by] to which it appears, and may exist and -DPS- expresses the radical of the fatty acid of a dimer -- [-- however, the ratio of A1:A2 1:0. depending on] which may have 05 to 1:2.0 mol in the range of 1:0.5 mols

advantageously, and the case A3) As opposed to the amount of a carboxylic acid given in A1 Saturation monocarboxylic acid in the amount to 0.1 mols, B) 1, 6-diaminohexan, 1, a 5-diamino-2-methyl-pentane, 2, 4, and 4(4, 4, 2)-trimethyl -1, 6-diaminohexan, at least 1(however, component A1)+ of the diamine which consists of a group of 1 and 9-diamino nonane and 1, and 12-diamino dodecane -- the rate of A2 and B among a C general formula:H2-N-(CH₂) n=COOH[type to the amino group and an acid radical, essentially, and it is the equivalent At least one of the amino carboxylic acid shown by] whose n is 5-11, or the lactam of its (however, per one mol of carboxylic acids, the amino carboxylic acid, or 0.5-1.5 mols of lactams of the acid indicated to A is used) -- the very thing -- at the temperature of 200-280 degrees C by the well-known approach The manufacturing method of a polyamide which is made to carry out a polycondensation, using an amidation catalyst in ordinary use together by the case, and is characterized by being made reduced pressure of less than 100mb in this case at the time of the conclusion of a reaction.

[Claim 6] B is an approach according to claim 5 by which 0.5 mols of isophthalic acid may be used as 1.0 mols of sebacic acids, and a component A2 as a component A1, however it may be substituted even for 0.05 mols even of isophthalic acid the fatty acid of a dimer depending on the case, and 1.5 mols of 1 and 6-diaminohexans are used, and, as for C, three mols of caprolactams are used.

[Claim 7] The approach according to claim 5 chosen so that Components A-C and the rate of those may have the melting point while a polyamide is 90-150 degrees C.

[Claim 8] An approach given in any 1 term to claims 5-7 chosen as viscosity is between 10 - 150 Pa-s when Components A-C and the rate of those are measured at 220 degrees C.

[Claim 9] The pasting-up method characterized by using the polyamide of a publication for any 1 term to claims 1-4 in the approach of pasting up the textiles, the metal, and glass which consist of the natural fiber and/or synthetic fiber like pasteboard, paper, a textile, and a fiber tapestry.

[Claim 10] The manufacturing method of the relief printed matter characterized by using the polyamide of a publication for any 1 term to claims 1-8 in the approach of manufacturing relief printed matter.